SANTA CLARA COUNTY
FLOOD CONTROL AND WATER DISTRICT

ANNUAL SURVEY REPORT

on

GROUNDWATER CONDITIONS

1971

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February 1971

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SANTA CLARA COUNTY
FLOOD CONTROL AND WATER DISTRICT
SAN JOSE, CALIFORNIA

DONALD K. CURRLIN General Manager	LLOYD C. FOWLER Director of Engineering

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GROUNDWATER CONDITIONS

1971

Report prepared by the

WATER SUPPLY PLANNING DIVISION

under the supervision of

DR. VICTOR M. GRAVETO
Division Engineer

February 1971

SANTA CLARA COUNTY
FLOOD CONTROL
WATER DISTRICT

516 EAST MARTHA STREET SAN JOSE, CALIFORNIA 95112

DONALD K. CURRLIN GENERAL MANAGER

February 9, 1971

The Board of Directors
Santa Clara County Flood
Control and Water District
516 East Martha Street
San Jose, California 95112

Gentlemen:

I am pleased to transmit to you the District Engineer's Annual Survey Report on Groundwater Conditions in the Santa Clara County Flood Control and Water District for 1971. The report, was prepared under the authority of Section 26.5 of the District Act and is the ninth of an annual series required as a prerequisite to the levy of the groundwater charge on the production of water from the groundwater supplies within the zones of the District.

The reported investigation finds that during the 1969-70 water year a condition of water supply surplus existed in the Santa Clara Valley Groundwater Basin and the accumulated overdraft of that Basin was reduced to 626,000 acre-feet because of the continued importation of supplemental water through the South Bay Aqueduct. During the same period in the Coyote and Llagas Groundwater Basins a condition of water supply deficit of a small magnitude occurred; however, no accumulated overdraft exists in these basins.

During 1969-70, 77,235 acre-feet of imported water was delivered through the South Bay Aqueduct and the District's In-County Water Distribution System for use in the Santa Clara Valley Groundwater Basin. Of this amount 39,170 acre-feet was delivered to treated water customers after filtration at the District's Rinconada Water Treatment Plant, 475 acre-feet was delivered to untreated water contractors, and the remaining 37,590 acre-feet of the imported water was used to recharge the groundwater basin. The District has requested delivery of 88,000 acre-feet of imported water for the 1970-71 water year. No imported water was delivered to the Coyote or Llagas Groundwater Basins.

I concur with the findings presented in this report and recommend that they be adopted as the prerequisite to the levy of groundwater charges for the fiscal year 1971-72 in the zones of the District.

Sincerely yours,

Donald K Curlin

General Manager

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ANNUAL SURVEY REPORT
ON
GROUNDWATER CONDITIONS

This report is a survey report on groundwater conditions in the Santa Clara County Flood Control and Water District for the 1969-70 water year*-- the ninth in a series of annual reports. This report and the previous ones are based on the same scope and methodology.

The purpose of the annual groundwater report is to provide the information, required by Section 26.5 of the District Act, that will serve as a basis for determining the groundwater charges for the ensuing water year 1971-72, by the District Board of Directors.

There are three major interconnected groundwater basins occupying about 240,000 of the 849,000 acres in Santa Clara County. These three major basins are shown on Plate 1 and are the Santa Clara Valley, the Coyote, and the Llagas Groundwater Basins. At the prescribed time for filing this report the areas in which a groundwater charge is levied by the District are Zones W-2, W-3.1, W-3.2, W-3.3 and W-3.4. These Zones are shown on Plate 1. The boundaries of Zone W-2 closely follow the boundaries of the Santa Clara Valley Groundwater Basin and the boundaries of Zones

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*Water year is defined in Section 26.1 of the District Act as "July 1st of one calendar year to June 30th of the following calendar year."

W-3.1, W-3.2, W-3.3 and W-3.4 are portions of the Coyote Groundwater Basin.

In Zone W-3 an ad valorem tax is levied in lieu of a groundwater charge; this Zone is shown on Plate 1 and includes most of the Coyote Groundwater Basin (except for Zones W-3.1, W-3.2, W-3.3 and W-3.4) and a portion of the Llagas Groundwater Basin.

Water Balance Analysis

Within any water year the essential elements of water supply to the groundwater basins of the District are precipitation, surface and subsurface inflow, and surface import. This water supply is disposed of by consumptive use, surface and subsurface outflow, and export. The difference between the water supply and the disposal of water is the seasonal surplus or deficiency that causes groundwater table fluctuations as water is replaced in or removed from storage. Utilizing information gathered by the District and cooperating agencies, a mass balance analysis of the elements of water supply and disposal for the groundwater basins of the District has been prepared in conformance with the method utilized in previous reports.

Table 1 lists the principal elements of water supply and disposal and indicates a 10,000 acre-feet surplus for the Santa Clara Valley Groundwater Basin, and small deficits of 1,000 and 4,000 acre-feet, respectively for the Coyote and Llagas Groundwater Basins.

TABLE 1

SUMMATION OF THE ANNUAL ITEMS OF WATER SUPPLY AND WATER DISPOSAL TO THE GROUNDWATER BASINS OF THE DISTRICT FOR THE WATER YEAR 1969-70

Values in Acre-Feet

Item	Groundwater Basin			
	Santa Clara Valley	Coyote	Llagas	Total
Water Supply				
Precipitation	160,000	13,000	91,000	264,000
Surface Inflow	145,000	53,000	83,000	281,000
Subsurface Inflow	58,000	3,000	12,000	73,000
Import	106,000*	0	0	106,000
Subtotal	469,000	69,000	186,000	724,000
Water Disposal				
Consumptive Use	291,000	21,000	113,000	425,000
Surface Outflow	53,000	45,000	63,000	161,000
Subsurface Outflow	0	4,000	10,000	14,000
Export (sewage)	115,000	0	4,000	119,000
Subtotal	459,000	70,000	190,000	719,000
Water Supply - Water Disposal = Surplus (+) or Deficiency (-)	+10,000	-1,000	-4,000	+5,000

*77,000 acre-feet imported through the South Bay Aqueduct and 29,000 acre-feet through the Hetch-Hetchy Aqueduct.

The importation of a total of 106,000 acre-feet to the Santa Clara Valley Groundwater Basin through the South Bay and Hetch-Hetchy Aqueducts accounts for the surplus of 10,000 acre-feet in this basin for 1969-70.

An independent check on the groundwater balance shown in Table 1 can be obtained by computing the change in storage directly from the groundwater contour maps. The net change in storage during the one year period is obtained by multiplying the appropriate areas by the corresponding change in elevation of the groundwater table at wells and by the corresponding specific yield.

Accordingly, the net change in storage in the Santa Clara Valley, Coyote and Llagas Groundwater Basins is found to be about +22,000, -900 and -13,000 acre-feet, respectively (as against the values of +10,000, -1,000 and -4,000 acre-feet, respectively, obtained by balancing the flow in and out of the basins--Table 1). These results provide, within the accuracy assignable to this analysis, satisfactory checks of the mass balance calculations.

Groundwater Contours

A groundwater contour map, showing lines of equal elevation of water levels in wells, and covering the three groundwater basins (Santa Clara Valley, Coyote and Llagas) as of August 1970 (seasonal low) is shown in Plate 2. Plate 3 shows lines of equal change in groundwater level during the period from July 1969 to July 1970.

In general, the Santa Clara Valley Groundwater Basin has had substantial recovery in groundwater levels during the year 1969-70 (Plate 3); the water levels in the Coyote Groundwater Basin seem to have remained nearly constant over the same period and those in the Llagas Groundwater Basin have fallen slightly.

Overdraft

The water levels of Santa Clara Valley Groundwater Basin are for the most part below sea level and also below the levels that existed in 1942. Using the water levels that existed in 1942 as a convenient reference, the amount of water removed from storage since then is defined herein as the accumulated overdraft. At the end of the 1969-70 water year, the accumulated overdraft is found to be about 626,000 acre-feet. The corresponding value for the 1968-69 water year was 648,000 acre-feet. Hence, the accumulated overdraft has been reduced by 22,000 acre-feet from that of the previous year.

In accordance with the Districts' Act the average annual overdraft is defined as the amount of groundwater equal to the average annual decrease in the amount of groundwater in storage that occurs during a long-term base hydrologic period under the particular set of physical conditions presently affecting the supply, use and disposal of water in the basins and Zones of the

District. To determine the average annual overdraft the long term (1935-47 for the Santa Clara Valley and Coyote Groundwater Basins and 1932-47 for the Llagas Groundwater Basin) average amounts of natural water supply and disposal are combined with the previous year's (1969-70) values of import, export and consumptive use. The results of these computations are shown in Table 2, and indicate that under present conditions, there is a surplus of about 12,000 acre-feet in the Santa Clara Valley Groundwater Basin, and no overdraft in the Coyote Groundwater Basin, or the Llagas Groundwater Basin.

Seasonal Groundwater Extractions

Table 3 shows the estimates of seasonal groundwater extractions for the water year of this report (1969-70). Also included in this table are projected values for the water years of 1970-71 and 1971-72. Values for the water year 1969-70 in the Santa Clara Valley Groundwater Basin are based on statements submitted by groundwater users as a requirement of the District's groundwater charge, whereas all other values in Table 3 are estimates based on assumed average year conditions.

Imported Water

Imported water from the South Bay Aqueduct is an important source for recharging the Santa Clara Valley Groundwater Basin as well as for other uses. During the 1969-70 water year 77,235

TABLE 2

SUMMATION OF THE AVERAGE SEASONAL ITEMS OF WATER SUPPLY AND WATER DISPOSAL UNDER PRESENT (1969-70) CONDITIONS TO THE GROUNDWATER BASINS OF THE DISTRICT

Values in Acre-Feet

Item	Groundwater Basin			Total
	Santa Clara Valley	Coyote	Llagas	
Water Supply				
Precipitation	214,000	15,000	101,000	330,000
Surface Inflow	160,000	68,000	58,000	286,000
Subsurface Inflow	19,000	3,000	12,000	34,000
Import	106,000	0	0	106,000
Subtotal	499,000	86,000	171,000	756,000
Water Disposal				
Consumptive Use	291,000	21,000	113,000	425,000
Surface Outflow	81,000	59,000	49,000	189,000
Subsurface Outflow	0	6,000	5,000	11,000
Export	115,000	0	4,000	119,000
Subtotal	487,000	86,000	171,000	744,000
Water Supply minus Water Disposal = Average Seasonal Overdraft (-) or Surplus (+)	+12,000	0	0	+12,000

TABLE 3

ESTIMATED SEASONAL GROUNDWATER EXTRACTIONS FROM THE GROUNDWATER BASINS OF THE DISTRICT*

Values in Acre-Feet

Water Year and Use	Groundwater Basin or Zone			Total
	Zone W-2	Coyote	Llagas	
1969-70				
Agric. Use	29,000	9,000	50,000	88,000
Urban Use	125,000	2,000	11,000	138,000
Total	154,000	11,000	61,000	226,000
1970-71				
Agric. Use	30,000	9,000	49,000	88,000
Urban Use	112,000	2,000	11,000	125,000
Total	142,000	11,000	60,000	213,000
1971-72				
Agric. Use	30,000	9,000	49,000	88,000
Urban Use	108,000	2,000	11,000	121,000
Total	138,000	11,000	60,000	209,000

*Recorded extractions are shown for Zone W-2 for the water year 1969-70; all the other values are estimates.

acre-feet of water were imported through the South Bay Aqueduct. Of this amount 37,590 acre-feet were delivered to percolation areas for recharge into the Santa Clara Valley Groundwater Basin, and 39,170 acre-feet of imported water were treated at the District's Rinconada Water Treatment Plant and delivered to the consumer through retail water agencies. In addition, 475 acre-feet of imported non-potable water was delivered on the surface for irrigation. In both the current (1970-71) and ensuing (1971-72) water years, 88,000 acre-feet of water is scheduled for delivery.

The water imported through the Hetch-Hetchy Aqueduct (29,000 acre-feet during 1969-70) is delivered directly into the water supply systems of Milpitas, Sunnyvale, Mountain View and the Purissima Water District in Northern Santa Clara County.

Water Charges

In order to pay for the District's share of the water importation program and a major portion of the cost of conservation of the local water, a county-wide ad valorem tax and a groundwater charge for water extracted from the groundwater basin, or delivered on the surface in lieu of extraction, was levied during the 1970-71 water year.

The county-wide ad valorem tax was set at 5 cents per 100 dollars assessed valuation on land and improvements. In Zone W-2 the groundwater charge was levied at $8.00 per acre-foot for groundwater extracted for agricultural purposes and at $29.00

per acre-foot for groundwater extracted for uses other than agriculture. For water delivered on the surface in lieu of groundwater extraction the charges were $10.50 per acre-foot of water used for agricultural purposes and $31.50 per acre-foot of water used for non-agricultural purposes. These values include a watermaster service charge. In Zone W-3 the ad valorem tax on land was set at 37 cents per 100 dollars of assessed valuation. For surface delivered water the charge was $3.00 per acre of land irrigated. In Zones W-3.1, W-3.2, W-3.3 and W-3.4 the groundwater charge was levied at $3.00 per acre-foot for groundwater extracted for agricultural purposes and at $10.40 per acre-foot of water extracted for uses other than agriculture.

Findings

A summary of the 1969-70 groundwater inventory in terms of surplus (or deficiency), accumulated overdraft, groundwater extraction, groundwater table condition and imported water is presented below along with the corresponding projected values for the 1970-71 and 1971-72 water years.

1. The annual water supply surplus (+) or deficiency (-) for the groundwater basins of the District for the water year of this report, 1969-70, and the corresponding projected values for the water years 1970-71 and 1971-72 were estimated and are as follows (in acre-feet):

Groundwater Basin	1969-70	1970-71	1971-72
Santa Clara Valley	+10,000	+12,000	+12,000
Coyote	- 1,000	0	0
Llagas	- 4,000	0	0

2. The long term accumulated overdraft at the end of the 1969-70 water year in the Santa Clara Valley Groundwater Basin is estimated to be 626,000 acre-feet, zero in the Coyote Groundwater Basin and zero in the Llagas Groundwater Basin.

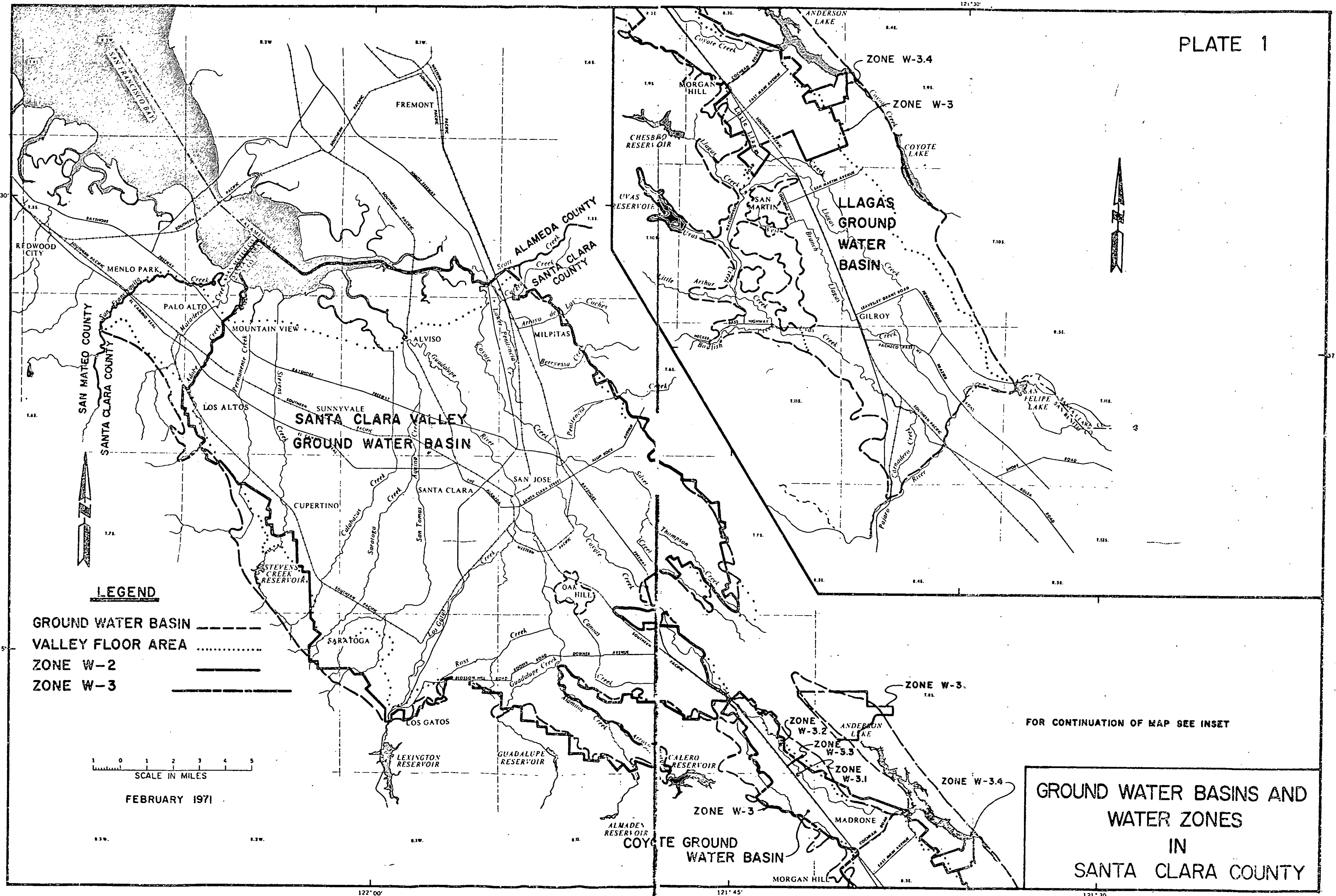
3. The estimated amounts of groundwater extracted during the water year of this report, 1969-70, and the corresponding projected values for the water years 1970-71 and 1971-72 are as follows (in acre-feet):

Groundwater Basin	1969-70	1970-71	1971-72
Santa Clara Valley	154,000	142,000	138,000
Coyote	11,000	11,000	11,000
Llagas	61,000	60,000	60,000

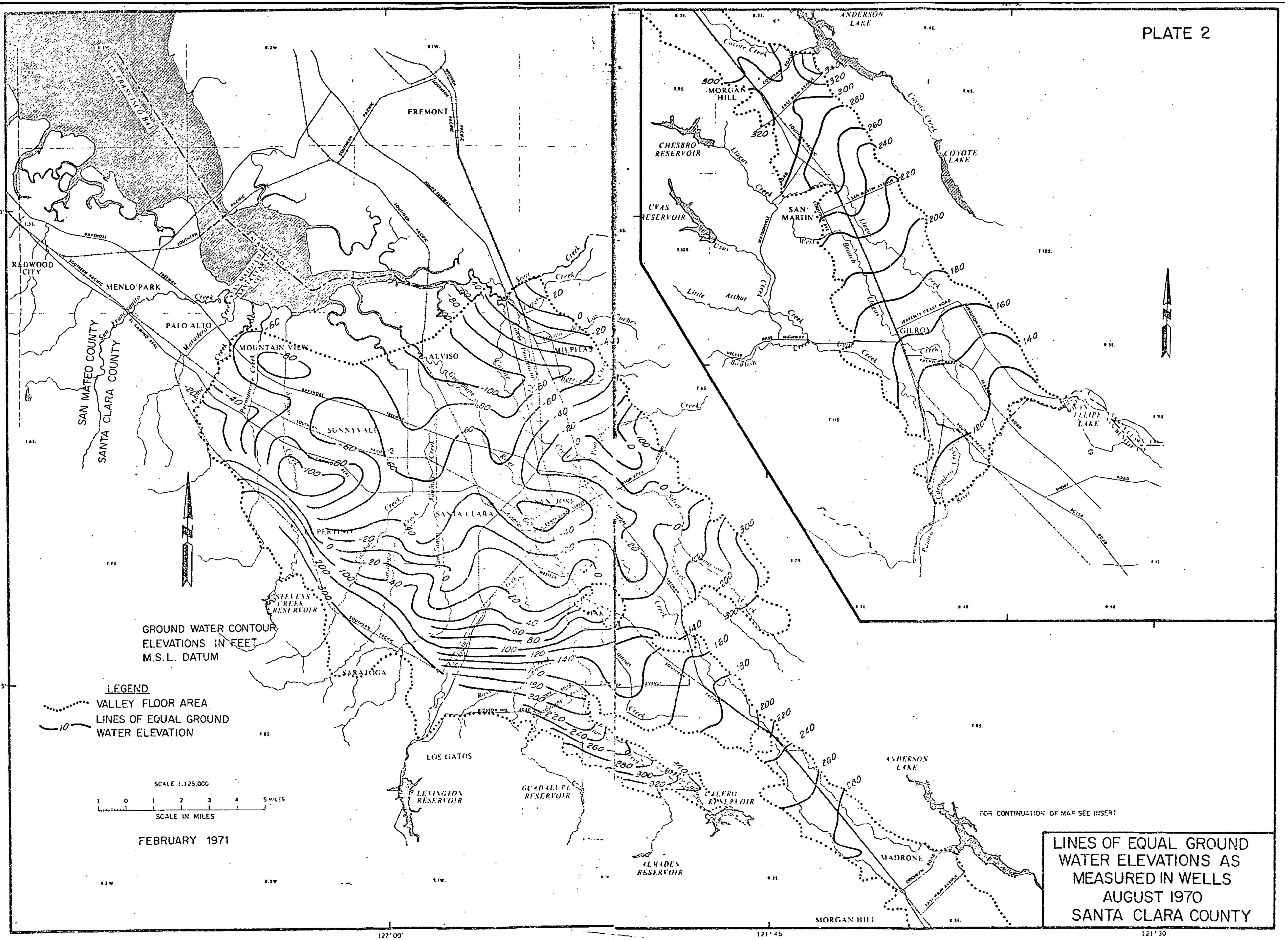
4. The lines of equal groundwater elevations as measured in wells are shown in Plate 2; the change from the previous year is one of recovery in the Santa Clara Valley Groundwater Basin; the groundwater elevations in the Coyote Basin have remained nearly the same as in the previous year and in the Llagas Basin have fallen slightly below the previous year's levels.

5. The District is obligated by contract to purchase 88,000 acre-feet of imported water from the South Bay Aqueduct in the ensuing (1971-72) water year.

PLATE 1



GROUND WATER BASINS AND WATER ZONES IN SANTA CLARA COUNTY



LINES OF EQUAL GROUND WATER ELEVATIONS AS MEASURED IN WELLS AUGUST 1970 SANTA CLARA COUNTY

GROUND WATER CONTOUR ELEVATIONS IN FEET M.S.L. DATUM

LEGEND

VALLEY FLOOR AREA

LINES OF EQUAL GROUND WATER ELEVATION

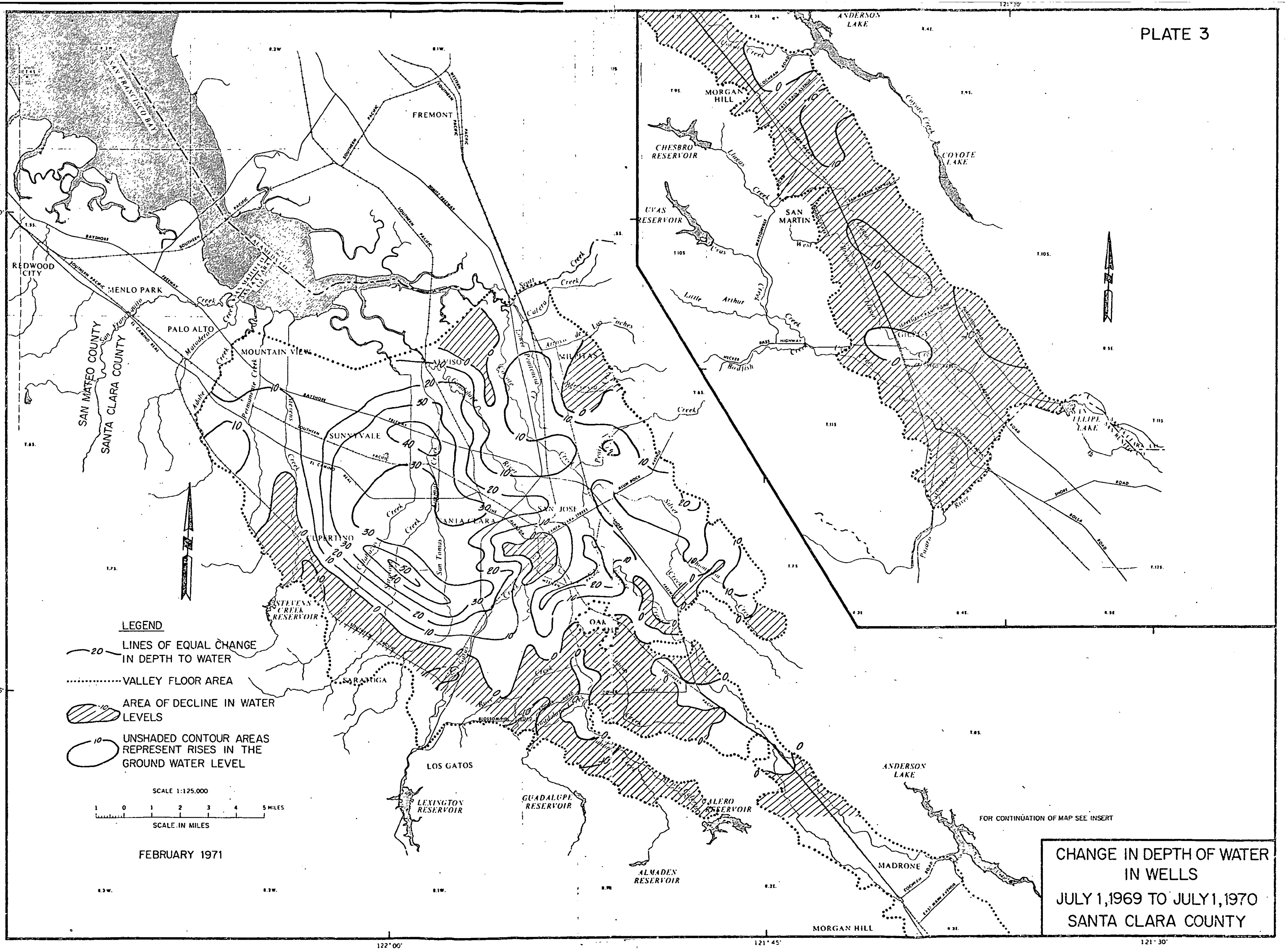
SCALE 1:125,000

SCALE IN MILES

FEBRUARY 1971

FOR CONTINUATION OF MAP SEE INSERT

PLATE 3



FEBRUARY 1971

CHANGE IN DEPTH OF WATER IN WELLS
JULY 1, 1969 TO JULY 1, 1970
SANTA CLARA COUNTY